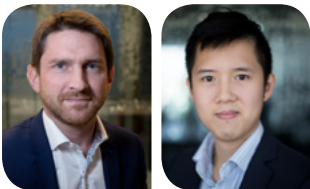# IMMERSING USERS IN YOUR REALITY!

AUGMENTED, VIRTUAL, AND MIXED REALITY TECHNOLOGIES ARE NOW REACHING MATURITY

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The start of 2019 saw a series of events that brought the rapidly evolving world of immersive technologies into focus; there were two in particular: Laval Virtual, Europe's largest trade show in the field, which brings together nearly 18,000 visitors; and the Mobile World Congress in Barcelona, where Microsoft presented the HoloLens 2, its new mixed reality headset.

More broadly, Augmented Reality (AR) and Virtual Reality (VR) are now essential features of all major technology conferences, a sign of a highly dynamic market. According to IDC1, overall global turnover (including hardware, software, and services) is expected to **grow by nearly 70% in 2019** (to over US$20bn, compared with US$12bn in 2018).

What lies behind this keen interest? Principally, the convergence of three factors: **the widespread availability of solutions** that offer a good user experience at an acceptable cost, the **emergence of business models** tailored to the corporate market; but, above all, the proof of the value that these technologies can add in several, **now proven, use cases.**

VIRTUAL TECHNOLOGIES ARE BECOMING INCREASINGLY WIDESPREAD

The technologies used vary depending on the degree of immersion: AR, VR, MR, or XR?... A quick recap on these is essential before discussing them further:

The market for virtual technologies has considerable momentum, with numerous, relevant solutions now being brought to market.

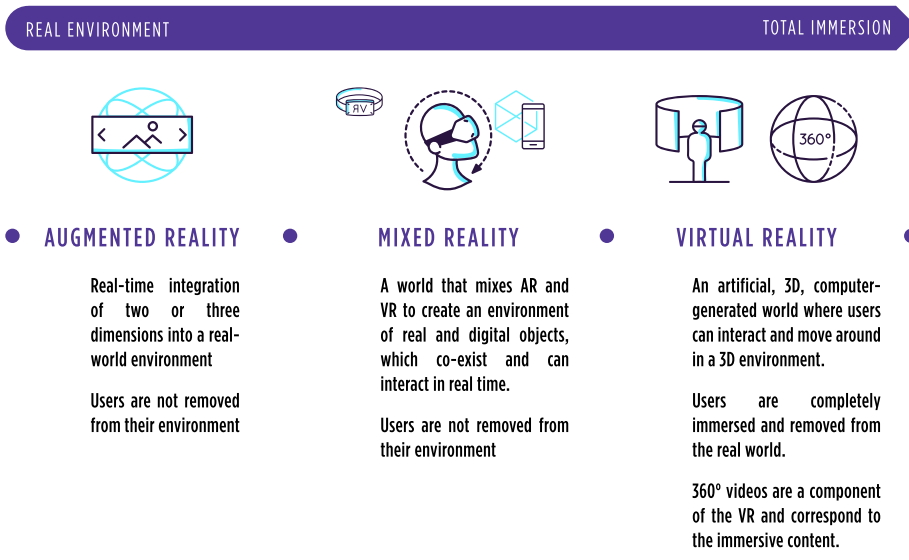### A VR offering reaching maturity at a reasonable cost

In recent months, we've seen an increase in VR headset offerings with the appearance of a range of new players—some European, but mostly Chinese (Lenovo, Xiaomi, Huawei, etc.). There are three families of VR products on the market:

/ **Passive headsets** / with a smart-phone

/ **Active headsets**/connected to a PC

/ **Autonomous headsets**/using wire-less

VR offerings are now nearing maturity and cover a broad range of user needs. There is a raft of available products, all positioned differently within the market (with different price points, uses, etc.).

Among several VR headsets launched in 2018, the Oculus Go, which has sold nearly 200,000 units since its launch, is making the VR experience more accessible as a result of its affordable price—around €350, including taxes. This headset is a trailblazer for a new trend, which is expected to continue into the future—where players frequently launch new, and increasingly powerful, autonomous headsets. This is illustrated by the launch of the Oculus Quest, expected to be released at the end of April 2019.

AR / VR /MR / XR definition

REAL ENVIRONMENT — TOTAL IMMERSION

AUGMENTED REALITY

Real-time integration of two or three dimensions into a real-world environment

Users are not removed from their environment

MIXED REALITY

A world that mixes AR and VR to create an environment of real and digital objects, which co-exist and can interact in real time.

Users are not removed from their environment

VIRTUAL REALITY

An artificial, 3D, computer-generated world where users can interact and move around in a 3D environment.

Users are completely immersed and removed from the real world.

360° videos are a component of the VR and correspond to the immersive content.

X, OR CROSS, REALITY

A term that encompasses all kinds of reality from AR to VR, and describes a continuum between them.

Best performing
• HTC Vive Pro (HTC)   • HTC Vive (HTC)

Best for screen quality
• Pixmax 8K (Pixmax)   • StarVR (Starbreeze / Acer)

Most mobile
• Oculus Go (Oculus)   • HTC Focus (HTC)

The AR/MR market: emerging but promising

Despite its promise, the augmented reality market is still struggling to persuade: **its offerings still have limited use** and fail to address all its intended use cases.

OUR SELECTION OF AR/MR DEVICES

Best performing
• HoloLens 2 (Microsoft)   • Magic Leap One (Magic Leap)

The best for autonomy
• Vuzix Blade (Vuzix)   • Google Glass Enterprise (Google)

The most ruggedized
• Daqri Smart Helmet (Daqri)   • Daqri Smart Glasses (Daqri)

The hardware offering is built around headsets and connected glasses.

Manufacturers of glasses are increasing the number of models on the market, but few of these can be used in real business applications due to their numerous limitations: reduced fields of vision, lack of autonomy, heaviness, fragility, etc.

Turning to the headsets, while technologically advanced, these remain highly expensive and viable only in experimental contexts.

Two further observations complete this overview of the AR market:

Toward "all terrain" headsets

The announcement of the release of the HoloLens2 headset promises to address the considerable limitations of the previous version, and facilitate large-scale adoption within companies by appealing to "front-line" business functions, not just R&D departments.

"Augmented" applications

The number of augmented reality mobile applications aimed at companied is increasing. Tim Cook claims more than a thousand applications that make use of AR. Blippar, Layar, Vuforia (PTC) and Metaio, acquired in 2015 by Apple, are among the leaders in mobile apps that make use of augmented reality.

Relevant business models are emerging which will enable, and better support, AR's widespread adoption by companies

Conscious of their B2B potential, and the challenges such solutions face, hardware and software providers are working hard to generate services and offerings that will better meet companies' expectations.

/ **Tailored equipment offerings for companies**: better performing head-sets, including guarantees and sup-port (for example, Oculus with its «VR for business» offering)

/ **Short/medium-term rental services:** to test or solve cost issues, but also those of content or experience qua-lity.

/ **Comprehensive «in situ» services:** that offer "mixed reality as a ser-vice"—with consultants managing an à la carte menu that includes a set of MR headsets, permanent technologi-cal upgrades, incident management, user support, etc.

/ **SaaS platforms** to create and share VR or AR content (such as Orange's VR experience platform or Face-book's Spaces—the virtual reality social network)

CONFIRMED BUSINESS USE CASES

Immersive technologies can offer real value, which centers around four main types of use case:

MARKETING & COMMUNICATION

Immersive marketing to envelop users in the world of a brand or product

A number of examples are already in place:

• L'Oréal's Genius Makeup simulator.

• Virtual apartment visits by BNP Real Estate.

• Kayak's Virtual Holidays.

• Emirates' VR-based, in-flight entertainment.

IMMERSIVE COLLABORATION

With the development of NWOW, there are now several applications:

Several startups are positioning themselves in this niche:

• Middle VR, with its Impoov solution to review designs in 3D

• Immersion, which offers virtual, collaborative meeting rooms

• Immersive with its AR-based collaboration solution

TRAINING

A dynamic ecosystem: startup Striv, which specializes in VR-based training, has raised US$16bn

• Walmart makes use of VR-based training to better train its employees in customer service. The aim? **To train 150,000 employees a year this way.**

• Fundamental Surgery offers a solution based on haptic gloves to enable surgeons to train in a natural and realistic way when using virtual reality.

• Tyson Foods reports a **20% reduction in work-related accidents**, compared with 2017, since the company started using VR-based training. 89% of employees say this option prepares them better than traditional-style training.

AUGMENTED ASSISTANCE

A high-potential use case: saved time, reduced costs, and better safety for complex operations

• Chevron is transforming the discipline of maintenance by introducing "augmented" inspections which use HoloLens headsets to reduce inspection costs for sites where access is difficult.

• Renault Trucks is simplifying quality-control tasks—reducing the mental workload on operators by using AR headsets to point out to them them the areas they need to check. The technique is expected to **be rolled out at large scale** in 2020.

• **Toward augmented surgery**: in 2018 the US's Food and Drug Administration approved the use of a medical visualization device for operating tables, which is based on an MR headset.

AND THIS IS JUST THE BEGINNING: TOWARD EVEN MORE IMMERSIVE AR/VR TECHNOLOGIES!

Three major new technologies will facilitate the deployment and use of immersive realities in the future, enabling them to be:

/ **Increasingly mobile and ergonomic:** as a result of 5G in particular, users will be able to experience AR and VR on the go—with very low latency and loading times.

/ **Ever-more interactive:** the arrival of haptic materials (such as gloves, suits, etc.) on the market will enhance the experience for users, enabling them to interact in virtual reality and «feel" their contact with virtual objects.

/ **Richer in terms of content:** the development of AR/VR-as-a-service type offering, including the availability of content-rich cloud platforms, will considerably reduce the price of AR and VR headsets.

KEY POINTS TO CONSIDER TO TAKE ADVANTAGE OF THESE TECHNOLOGIES

Given this technological diversity, and the many use cases that AR and VR can potentially address, how can you take advantage of them? There are four major recommendations to follow in order to determine the right use cases, develop the necessary skills, and ultimately take full advantage of these new technologies:

The keys to success in an AR/VR project are:

/ **Making use of good design methodologies** (Design Thinking, UX De-

sign, etc.) that can involve users from the start of an AR/VR project; this will help ensure you identify the right use cases (the «killer apps") that can closely meet your needs;

/ **Understanding the market offering**, and targeting the right solutions with business models that fit your company's level of maturity;

/ **Knowing how to slot these solutions into your IS**—to ensure interoperability with your infrastructures, application portfolio, and data-governance approach (including 3D).
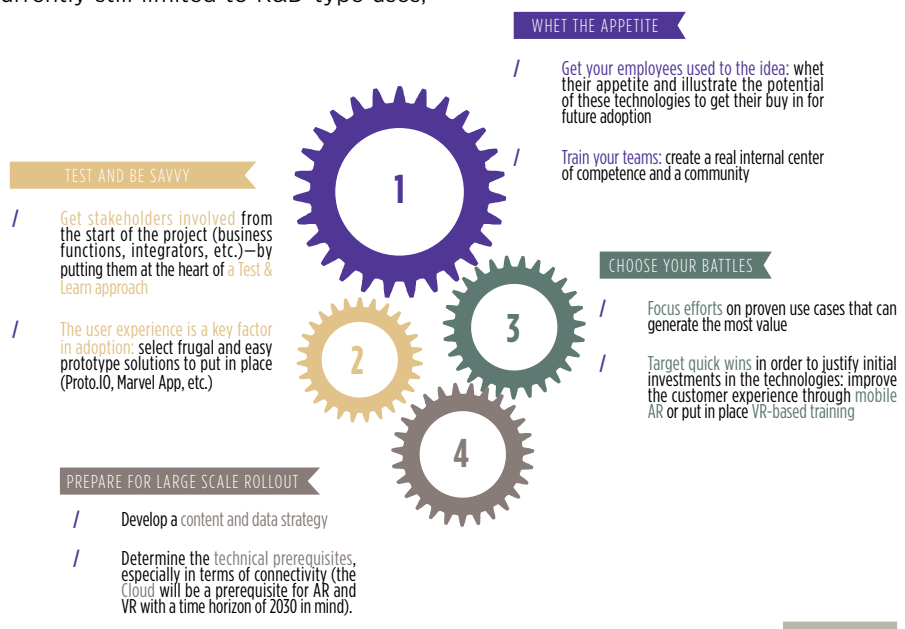
CONCLUSION

The market for immersive technologies now has considerable momentum—something that businesses need to capitalize on if they are to develop richer experiences for their users, customers, or employees.

Concrete and relevant solutions are being brought to market: virtual reality solutions are widespread and cover most business-specific use cases; augmented reality is currently still limited to R&D-type uses,

but the promise of Hololens2 and progress on DAQRI helmets signal a much larger playing field in the near future. Until AR headsets become more ergonomic and, in particular, more accessible, it seems that the main driver for the AR market will be the rapid development of AR-compatible mobile applications—solutions that can be marketed at more reasonable prices than those of the AR/MR helmets, and which have fewer limitations.

Concrete service offerings are emerging, ranging from rental options, through the provision of development platforms, to B2B-specific hardware, turnkey services, etc. In short, all the necessary conditions are in place to facilitate the development and use of these technologies. **The ROI that AR/VR offers has now been clearly demonstrated for several use cases—and the time to take advantage of these is now!**

WHET THE APPETITE

/ Get your employees used to the idea: whet their appetite and illustrate the potential of these technologies to get their buy in for future adoption

/ Train your teams: create a real internal center of competence and a community

TEST AND BE SAVVY

/ Get stakeholders involved from the start of the project (business functions, integrators, etc.)—by putting them at the heart of a Test & Learn approach

/ The user experience is a key factor in adoption: select frugal and easy prototype solutions to put in place (Proto.IO, Marvel App, etc.)

CHOOSE YOUR BATTLES

/ Focus efforts on proven use cases that can generate the most value

/ Target quick wins in order to justify initial investments in the technologies: improve the customer experience through mobile AR or put in place VR-based training

PREPARE FOR LARGE SCALE ROLLOUT

/ Develop a content and data strategy

/ Determine the technical prerequisites, especially in terms of connectivity (the Cloud will be a prerequisite for AR and VR with a time horizon of 2030 in mind).

The Positive Way

WAVESTONE